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IS 12883 : 1989
(Reaffirmed 2004)

Indian Standard

POLYVINYL CHLORIDE (PVC) BOTTLES FOR EDIBLE OILS — SPECIFICATION

UDC 621·798·147 [678·743·22] : 664·3

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 1990 **Price Group 2**

Plastics Containers Sectional Committee, PCD 21

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 12 December 1989, after the draft finalized by the Plastics Containers Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Polyvinyl chloride (PVC) bottles are being widely used for the packaging of liquid products, such as shampoos, hair oils, lotion and household detergents. With the availability of PVC resin with vinyl chloride monomer (VCM) content less than 5 ppm in the country, its use for production of PVC bottles for packaging of food products, namely, non-carbonated beverages, fruit juices and edible oils is also felt safe and is recommended in IS 10171 : 1986 'Guide on suitability of plastics for food packaging (*first revision*)'. However, the basic PVC and its copolymers material standard IS 10151 : 1982 'Specification for polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water' covering the threshold limits for the safe use of PVC as a food grade packaging material lays down three limits of VCM content as follows:

a) In resin : 5 ppm, *Max*

b) In PVC container/film : 1 ppm, *Max*

c) Residual migration of VCM in foodstuffs : 10 ppb, *Max*

Test methods for determining VCM content in resin and film/container have been included in Annex A of IS 10151 : 1982. Test methods for residual VCM in foodstuff at 10 ppb level is under development and can, therefore, be included only when available.

In view of the above, the Plastics Sectional Committee, PCD 12 has recommended that for the present, it would be adequate (even for the purpose of granting Standard Mark) if the VCM content is tested in the resin and the film or container as specified in method of test given in Annex A ofIS 10151 : 1982.

Further, to ensure the suitability of PVC bottles for different edible oils, storage test (**9.4**) has been included in this standard which should be done by the edible oil manufacturer before selecting them for the packaging of their product.

In reporting the result of a test or analysis is made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

POLYVINYL CHLORIDE (PVC) BOTTLES FOR EDIBLE OILS — SPECIFICATION

1 SCOPE

1.1 This standard specifies the requirements and the methods of sampling and test of polyvinyl chloride (PVC) bottles for packing of 1 and 2 kg edible oils.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
4905 : 1968	Methods for random sampling
7028 (Part 2) : 1973	Performance tests for complete, filled transport packages : Part 2 Vibration test
7328 : 1974	Specification for high density polyethylene materials for moulding and extrusion
7408 (Part 1) : 1984	Blow moulded polyolefin containers : Part 1 Up to 5 litre capacity (*first revision*)
8639 : 1977	Code for evaluation of the effect of packaging and storage on the sensory qualities of foods and beverages
10151 : 1982	Specification for polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions prescribed in IS 7408 (Part 1) : 1984 shall apply.

4 MATERIAL

4.1 The bottle shall be made by blow moulding process from polyvinyl chloride (PVC) and its copolymers material conforming to the requirements of IS 10151 : 1982.

4.2 Cap

The bottles shall be provided with a cap, and if required, with an insert plug. The material for cap and plug shall be foodgrade HDPE injection moulding grade 45 MA or 55 MA (*see* IS 7328 : 1974) or any other suitable material as agreed to between the purchaser and the supplier.

4.2.1 *Wad*

The wad, if required, shall be of cork board or pulpboard or any other suitable material compatible with the contents and suitable for food contact applications.

5 CAPACITY

5.1 Brimful Capacity

The minimum brimful capacity of 1 and 2 kg bottles when measured by the method given in Annex A shall be 1 140 and 2 260 ml, respectively.

NOTE — Brimful capacity shall vary depending upon the type of oil being packed and shall be specified by the purchaser.

6 MASS TOLERANCE

6.1 The tolerance on the specified mass of the bottle with the cap shall be ±5 percent.

7 SHAPE AND DESIGN

7.1 The shape and design shall be as agreed to between the purchaser and the supplier.

7.2 Tolerance

The tolerances on specified diameter and the overall height of the bottle shall be as under:

Up to and including 100 mm	: ± 1·5 mm
Over 100 mm and up to and including 200 mm	: ± 2·0 mm
Over 200 mm	: ± 2·5 mm

7.3 Wall Thickness

The minimum wall thickness of the bottle measured at any point by a dial caliper gauge fitted with spherical anvil, vernier calipers or micrometer shall be 0·25 mm. The mean of three readings at any location shall be taken as the wall thickness at the point.

8 WORKMANSHIP AND FINISH

8.1 The bottles and closures shall be manufactured in accordance with good manufacturing practices and shall be free from any burnt, oxidized or unhomogenized particles. The bottles shall be clear and transparent, and free of any scratches.

9 TESTS

9.1 Closure Leakage Test

The bottle filled with water at ambient temperature and closed tightly with the cap when subjected to vibrations on a vibration table as detailed in Annex A, shall not show any leakage through the closure after one hour of testing.

9.2 Drop Impact Test

The bottle and the cap when subjected to the drop test as given in Annex B shall not show any sign of cracking. Slight deshaping of the body shall not render the bottle unacceptable in the test.

9.3 Stacking Test

The bottles shall not show any leakage, cracks, or permanent buckling when subjected to test as described in **9.3.1**.

9.3.1 Arrange four bottles, filled with water at ambient temperature to their nominal capacity and closed with their caps to the normal torque on a flat level surface in a block of 2×2 without any other support. Apply a top load evenly distributed on a flat surface placed on unsupported bottles and examine after 24 hours. The total superimposed load on the flat surface shall be as under:

Bottle Capacity	*Top Load for Four Bottles*
kg	N
1	400
2	600

9.4 Storage Test

This shall be a type test. The storage test shall be carried out both at 38 ± 1°C and 90 ± 2 percent RH (accelerated condition) and 27 ± 1°C and 65 ± 2 percent RH (standard condition). The change in free fatty acids (as percentage of oleic acid), moisture content, peroxide value as milliequivalent of oxygen per kilo fat (wherever applicable) and rancidity in accordance with IS 8639 : 1977, of the content shall be noted at the end of 60 and 180 days when tested under accelerated and standard conditions, respectively. Bottles shall be accepted if the edible oil does not show rancidity or increase in the values of the moisture content, free fatty acid and peroxide value above the permissible limits specified in the corresponding Indian Standards on edible oils at the end of 60 days and 180 days under accelerated and standard condition, respectively.

NOTE — If agreed to between the purchaser and the supplier, testing of oils at frequent intervals may be carried out during storage.

10 MARKING

10.1 Each bottle shall be marked with the indication of the source of manufacture.

11 SAMPLING

11.1 Samples of bottles shall be drawn and the criteria for conformity determined as described in Annex C.

ANNEX A

(*Clause* 9.1)

CLOSURE LEAKAGE TEST

A-0 GENERAL

A-0.1 The method helps to determine the ability of a closure (on a container) to prevent leakage due to transportational vibration.

A-1 APPARATUS

A-1.1 Vibrating Table, conforming to IS 7028 (Part 2) : 1973.

A-2 PROCEDURE

A-2.1 Fill the bottle to its nominal capacity with the product/water and close it with the usual closure in the manner in which it is intended to be used.

A-2.2 Mount the bottle upside down rigidly on the vibrating table and subject to vibrations for 1 hour at a peak acceleration of 1G.

A-2.3 At the end of the test period, the closure shall show no indication of leakage, loss of tightness, backing-off or popping.

A-3 PRECAUTIONS

A-3.1 Before the test is carried out, it should be ensured that the inner plug, if provided, and the cap are fully tightened.

ANNEX B

(*Clause* 9.2)

DROP IMPACT TEST

B-1 APPARATUS

B-1.1 The apparatus shall consist of a vertical scale marked in 150 mm increments from 1 to 4 m fixed above a rigid flat base of steel or smooth concrete as a dropping surface.

B-2 PROCEDURE

B-2.1 The bottles shall be filled to their nominal capacity with water at ambient conditions and closed tightly with the cap. Each bottle shall be dropped freely from a height of 1·2 m in the following sequence:

a) Vertical position so that the bottom strikes the impact surface flat;

b) Horizontal position so that the bottle strikes the impact surface horizontally with its side flat.

B-2.2 Bottles shall not show any leakage of water through cracks or closures. Slight denting shall not be taken as the failure of the bottle in the test.

ANNEX C

(*Clause* 11.1)

SAMPLING

C-1 SCALE OF SAMPLING

C-1.1 Lot

In any consignment, all the bottles of the same material, nominal capacity and drawn from a single batch of manufacture shall be grouped together to constitute a lot.

C-1.2 Scale of Sampling

For ascertaining the conformity of the lot to the requirements of this standard, tests shall be carried out for each lot separately. The number of bottles to be sampled from a lot shall be in accordance with Table 1.

C-1.3 The bottles shall be selected at random from the lot. To ensure the randomness of selection, methods given in IS 4905 : 1968 may be followed.

C-2 CRITERIA FOR CONFORMITY

C-2.1 Visual Examination

The sample bottles selected in accordance with col 2 of Table 1 shall be examined for workmanship and finish (**8.1**). Any bottle failing in one or more of the requirements shall be termed as defective. The lot shall be accepted under this head if the number of defective bottles in sample does not exceed the acceptance number given in col 3 of Table 1.

C-2.2 Brimful Capacity and Bottles Mass

For the purpose of above tests, five bottles for lot size up to 5 000 and 10 bottles for lot size above 5 000 shall be selected at random from the samples already drawn according to **C-1.3**. Each of the sample bottles shall be subjected to tests for brimful capacity (**5.1**) and container mass (**6.1**). There shall be no failure if the lot is to be accepted under this clause.

C-2.3 Test for Closure Leakage and Stacking

The number of sample bottles to be drawn shall be in accordance with col 4 of Table 1. Each of the sample bottles shall be subjected to closure leakage and stacking test. Any bottle showing leakage, crack or permanent buckling when subjected to tests will be taken as defective. The number of defectives shall not exceed the acceptance number given in col 5 of Table 1 for the lot to be accepted as conforming to the specification.

C-2.4 Drop Test

Take a sample of size of ten bottles at random from a lot. Divide these into two sets of five bottles each, designated as Set 1 and Set 2.

C-2.4.1 Each bottle of Set 1 shall be subjected to the above mentioned test. Leakage of water through cracks or closures after the test shall be considered as a defect. However, slight denting shall not be taken as the failure of the bottle in the test.

C-2.4.2 If none of the bottles fail in the test, the lot shall be accepted. If only one bottle is found defective, the test shall be repeated on the second set of bottles (*see* **C-2.4**), otherwise the lot shall be rejected.

C-2.4.3 If in the second set, none of the bottles are found defective, the test shall be accepted as conforming to the specification.

C-2.5 The sub-sample of size given in col 6 of Table 1 shall be subjected to dimensional examination. No failure shall occur for acceptance of the lot under this clause.

Table 1 Scale of Sampling and Acceptance Number

(*Clauses* C-1.2, C-2.1, C-2.3 *and* C-2.5)

Lot Size	**For Visual Examination** (*Clause* 8.1)		**For Closure Leakage Test** (*Clauses* 9.1 and 9.3)		**For Dimensionnal Examination** (*Clauses* 7.2 and 7.3)
	Sample Size	Acceptance Number	Sample Size	Acceptance Number	No. of Samples
(1)	(2)	(3)	(4)	(5)	(6)
Up to 500	13	1	5	0	2
501 to 1 000	20	2	8	0	2
1 001 to 3 000	32	3	13	0	2
3 001 to 5 000	50	5	20	1	3
5 001 and above	80	7	32	2	5

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The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75
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(Common to all Offices)

Regional Offices:	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	37 86 62
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AMENDMENT NO. 1 JULY 1997
TO
IS 12883 : 1989 POLYVINYL CHLORIDE (PVC) BOTTLES FOR EDIBLE OILS — SPECIFICATION

(*Second cover page, Foreword*) — Insert the following matter at the end of fourth para:

'With the promulgation of the *Standards of Weights and Measures (Packaged Commodities) Third Amendment Rules*, 1994, that edible oils, *Ghee*, *Vanaspati* and butter oil may be packed by weight or volume basis in sizes 50 g/ml, 100 g/ml, 200 g/ml, 500 g/ml, 1 kg/litre, 2 kg/litre, 5 kg/litre thereafter in multiples of 5 kg/litre, it has become necessary to make suitable provisions in the standard. The Rule also states that in case packing has been done on mass basis declaration of volume within brackets, and if it is done on volume basis declaration of mass within brackets is to be done. Through this amendment the changes which are necessary for packing of edible oils on volume basis are being brought out.'

(*Page* 1, *clause* 1.1, *line* 3) — Substitute '1 kg/litre and 2 kg/litre' *for* '1 and 2 kg'.

(*Page* 1, *clause* 5.1) — Substitute the following for the existing clause:

'5.1 Brimful Capacity

The minimum brimful capacity of 1 kg/litre and 2 kg/litre bottles when measured by the method given in Annex A shall be 1 140/1 030 and 2 260/ 2 130 ml respectively.

NOTE — Brimful capacity shall vary depending upon the type of oil being packed and shall be specified by the purchaser.'

(*Page* 2, *clause* 9.3.1, *Informal table, col heading 'Bottle Capacity'*) — Substitute 'kg/litre' *for* 'kg'.

(PCD 21)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 JULY 2003
TO
IS 12883 : 1989 POLYVINYL CHLORIDE (PVC) BOTTLES FOR EDIBLE OILS — SPECIFICATION

(*Foreword, para* 6) — Insert the following new paras after para 6:

'A scheme of labelling environment friendly products with the ECO logo has been introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO-Mark is being administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolutions No. 71 dated 21 February 1991 and No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with the ECO logo, it shall also carry the ISI Mark of the BIS besides meeting additional environment friendly requirements. For this purpose the Standard Mark would be a single mark being a combination of the ISI Mark and the ECO logo.

This amendment is based on the gazette Notification No. 170 dated 18 May 1996 for plastic products as environment friendly products published in the Gazette of the Government of India. This amendment is, therefore, being issued to this standard to include environment friendly requirements for Polyvinyl chloride (PVC) bottles for edible oils .'

(*Page* 2, *clause* **9.4**) — Insert the following new clauses after **9.4** and renumber the subsequent clauses:

'10 ADDITIONAL REQUIREMENTS FOR ECO-MARK

10.1 General Requirements

10.1.1 The product shall conform to the requirements for quality, safety and performance prescribed.

10.1.2 The manufacturer shall produce to BIS the consent clearance as per the provisions of *Water (Prevention & Control of Pollution) Act*, 1974 and *Air (Prevention & Control of Pollution) Act*, 1981 along with the authorization, if required under *Environment (Protection) Act*, 1986 and the Rules made thereunder while applying for the ECO-Mark. The manufacturer shall produce documentary evidence with respect to the compliance of regulation under *Prevention of Food Adulteration Act*, 1954 and *Drugs and Cosmetic Act*, 1940 and Rules made thereunder, wherever necessary.

10.1.3 The product must display a list of critical ingredients in descending order of quantity present expressed as percent of the total. The list of such ingredients shall be identified by Bureau of Indian Standards.

10.1.4 The product packaging shall display in brief the criteria based on which the product has been labelled as 'Environment Friendly'.

10.1.5 The material used for product packaging shall be recyclable or biodegradable.

10.1.6 It shall also suitably mention that ECO-Mark label is applicable only to the packaging material/package, if content is not separately covered under ECO-Mark. It may be stated that ECO-Mark is applicable to the product or packaging material or both.

10.2 Product Specific Requirements

For the manufacture of this product one or more of the virgin material covered in following Indian Standards shall be used:

IS No.	*Title*
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10146 : 1982	Polyethylene for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10151 : 1982	Polyvinylchloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11434 : 1985	Ionomers resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11704 : 1986	Ethylene/acrylic acid (EAA) copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12247 : 1988	Nylon-6 polymer for its safe use in contact with food-stuffs, pharmaceuticals and drinking water
12252: 1987	Polyalkylene terephthalates (PET & PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water

(PCD 21)

Reprography Unit, BIS, New Delhi, India